

The final office action mailed on 11-4-10 has been reissued as requested by Mr. Martin Sulsky during the telephone interview conducted on 3-25-11.

This office action includes a new grounds for rejection of claim 1 under 35 U.S.C. 103. Accordingly, this action has been made non-final.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Morita et al.

With respect to claim 1, Morita et al disclose an ultrapure water production plant (see FIG. 2) producing ultrapure water including an ultraviolet oxidation equipment 21 capable of decomposing an organic compound contained in the primary pure water and generating a decomposition product of the organic compound (see lines 19-28 of col. 6

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and lines 33-37 of col. 7) and a catalyst mixed tower 29 (see FIG. 9a) located downstream of the ultraviolet oxidation equipment 21 and having catalyst supports each of which has a catalyst carried on a support for removing hydrogen and hydroxyl radicals from the water (see lines 28-32 of col. 7), the catalyst mixed tower also having anion exchange resins which is capable of absorbing and removing decomposition product of the organic compound (see lines 24-28 of col. 6), the ratio of the catalyst supports to the anion exchange resins as being between 3% and 20% by weight (e.g., the ratio being approximately 12.5% assuming the catalyst supports and anion exchange resin has the same density and 35 L of anion exchange resin is used as per the comparative example in cols. 11-12). Alternatively, modifying the apparatus of Morita et al so as to have included 3-20 wt% catalyst supports would have been obvious in order to optimize the catalyst mixed tower for removing a particular amount of hydrogen of hydroxyl radicals from the water.

Claims 2-3, and 5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al in view of Kazuki et al.

With respect to claim 2, Morita et al disclose de-mineralizing equipment 22 located downstream of the catalyst mixed tower but fail to specify a membrane degasser located in the downstream of the catalyst mixed tower. Kazuki et al disclose an analogous system that includes a degasser 15 located downstream of a catalyst unit 14 and teaches that such an arrangement removes gases produced by the UV radiation unit and catalyst unit. It would have been obvious to have modified the system of Morita

et al so as to have included a degasser as suggested by Kazuki et al in order to remove gases evolved by the UV radiation unit and the catalyst unit.

As to claim 3, Morita et al disclose the demineralization equipment 22 as being an ion exchange resin tower including a mixed bed in which the anion exchange resins and cation exchange resins are mixed (see lines 41-42 of col. 10).

With respect to claim 5, Morita et al disclose a ratio of the catalyst supports to the anion exchange resins as being between 3% and 20% by weight and 8% and 13% by weight (e.g., .1-10%, see lines 14-17 of col. 7).

Concerning claim 6, Morita et al discloses a palladium catalyst that is capable of decomposing hydrogen peroxide (see lines 61-62 of col. 6).

As to claim 7, Morita et al disclose the catalyst as being selected from palladium (see lines 61-62 of col. 6).

As to claims 8 and 9, Morita et al disclose the support as being an ion exchange resin in the form of an anion exchange resin (see lines 17-21 of col. 7).

Concerning claim 10, Morita et al disclose that the supports can be in any form including granules (see from line 66 of col. 6 to line 1 of col. 7) and discloses anion exchange resins that are typically in the form of beads which are spherical (e.g., the Dowex 550A anion exchange resin mentioned on line 59 of col. 11).

Regarding claim 11, Morita et al disclose anion exchange resins that are strong base anion exchange resins (e.g., Dowex 550A, see line 59 of col. 11).

As to claim 12, Morita disclose a substrate of the anion exchange resins as being selected from styrene origins (e.g., Dowex 550A).

Concerning claim 13, Morita disclose the substrate of the anion exchange resins as having a structure which is selected from a gel type (e.g., Dowex 550A).

Regarding claim 14, Morita et al disclose the catalyst mixed tower as holding the anion exchange resins and the catalyst supports in a mixed state (see lines 45-47 of col. 7).

As to claim 15, Morita et al disclose the catalyst mixed tower as holding the anion exchange resins and the catalyst supports separately (e.g., in a laminate of layers, see line 47 of col. 7 or elements 22 and 49 in FIG. 9b).

Concerning claim 16, Morita et al disclose the catalyst mixed tower (see FIG. 9b) as being a layered bed type holding a catalyst support layer 49 located on an inflow side of the liquid to be processed and an anion exchange resin layer 22 located on an outflow side of the liquid.

As to claim 17, Morita et al disclose the catalyst mixed tower as further including cation exchange resins (see lines 45-47 of col. 7).

With respect to claim 18, Morita et al and Kazuki et al fail to mention a velocity of 10 to 200 hr<sup>-1</sup>, however, such a modification would have been obvious in order to optimize the degree of purification of the water for a particular application.

Concerning claim 19, Morita et al disclose a direction of the liquid to be processed as being set to downflow (see FIGS 9a and 9b).

With respect to claim 20, Morita et al and Kazuki et al fail to specify the primary pure water as having a resistivity equal to or greater than 10 MΩcm, a dissolved oxygen concentration of 0 to 1000 µg / L, an organic compounds concentration of 0 to 20 µg/L,

and a metal concentration of 0 to 1  $\mu\text{g/L}$ , however, such a modification would have been obvious in order to optimize the efficiency of the ultrapure water production plant for a particular application.

Applicant's arguments filed 8-27-10 have been fully considered but they are not persuasive.

Applicant's argument that Morita et al disclose using an anion exchange resin to support the catalyst is noted, however, instant claim 1 is not limited to any particular type of catalyst support and therefor fails to patentably define over Morita et al. In addition, applicant's invention appears also to be limited to an anion exchange resin for supporting the catalyst (see paragraph 41 of the instant invention). Applicant also argues that Morita fails to disclose a ratio of catalyst supports to anion exchange resin of 3-20%, however, Morita et al disclose such a range since 5% of the bed thickness can be made up of the catalyst supports (see example 1 in col. 12). Alternatively, providing such a ratio would have been obvious in order to optimize the catalyst mixed tower for removing a particular amount of hydrogen or hydroxyl radicals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew O. Savage whose telephone number is (571) 272-1146. The examiner can normally be reached on Monday-Friday, 7:00am-3:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew O Savage/  
Primary Examiner  
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